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The Impact of the Risk Perception of the COVID-19 Pandemic on College Students' Loneliness: The Mediating Role of Psychological Resilience

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ABSTRACT

In order to explore how universities provide psychological counseling work for college students, we investigated the relationships between and mechanisms behind risk perception, psychological resilience, social support, and loneliness. The study found that (1) The risk perception of the COVID-19 pandemic had a significant positive predictive effect on college students' loneliness. (2) Psychological resilience played a mediating role between the risk perception of the COVID-19 pandemic and loneliness. (3) Social support played a moderating role between the risk perception of the COVID-19 pandemic and loneliness. The results show that the risk perception of the COVID-19 pandemic both directly and indirectly affected college students' loneliness, the latter through psychological resilience, and that social support can regulate risk perception and loneliness; in other words, social support can reduce the negative impact of risk perception on loneliness. The research conclusions have practical guiding significance for preventing, intervening in, and alleviating college students' loneliness.

Keywords: COVID-19 Pandemic; Risk perception; Loneliness; Psychological resilience; Social support; College student

1. Introduction

In December 2019, COVID-19 began to spread rapidly around the world (Lima et al., 2020).[9] The World Health Organization designated the COVID-19 pandemic as a public health emergency of international concern (Liu et al., 2021).[12] This pandemic was the most serious public health emergency since the founding of the People's Republic of China. Its wide range and rapid infection rate and the difficulties in preventing and controlling the virus were unprecedented (Husky et al., 2020).[8]

The COVID-19 pandemic not only seriously affected people's normal production and life, but research shows that it also led to psychological issues such as anxiety, depression, and loneliness (Zhao et al., 2021).[30] The strong infectivity of COVID-19 increased people's psychological stress levels, producing negative emotions such as anxiety, fear, and depression. In addition, new adaptability problems caused by the pandemic, such as factory shutdowns, student suspensions, university closures, urban management and control measures, the ability to detect nucleic acids, and so on, caused inconvenience, anxiety, and other psychological problems for everyone (Tang & Yang, 2023).[21] Some people stayed at home. With the passage of time, loneliness deepened, leading to negative emotions. Some people could not bear the pressure of life because they could not work to earn money, leading to self-injury and suicide. Others wanted to extricate themselves from the pain through excessive drinking, smoking, profligacy, playing games, and other behaviors, leading to a muddled life and even more emotional collapse, and possibly to serious criminal behavior. These psychological problems caused by the COVID-19 pandemic were encountered in various groups to varying degrees, and such problems were more prominent for college students.

According to survey data from the 2022 blue book on national depression, the number of people suffering from depression in China reached 95 million, among whom 50% were students in school (Zhu & Zhang, 2023).[33] On the one hand, the psychological problems of college students are more prominent (Sylvia et al., 2021).[20] The current group of college students is coming of age during a time of rapid change. Most of them are only children. The growing loneliness, a large amount of false information, serious complexity, the temptation of electronic entertainment, and so on lead to increasingly serious psychological problems among college students. On the other hand, college students' psychological state is not yet fully mature, and they lack experience in dealing with major emergencies.

When emergencies occur, they will inevitably be afraid and anxious. The sudden pandemic situation forced college students to shift to close management and online teaching, which abruptly changed the pace of their life and learning and increased the pressure regarding their employment and postgraduate entrance examinations. This made it difficult for college students to adapt, and they experienced problems such as tension, anxiety, sleep problems, and fear of the coronavirus. These long-term psychological problems among college students will affect their physical health and the efficiency of their education and life, make interpersonal communication difficult, and lead to suspensions, withdrawals, and even suicide. College students are the future of the motherland and the hope of the society. The COVID-19 pandemic seriously affected their mental health. Therefore, it is necessary to explore the impact of pandemic risk cognition on college students' mental health and its internal mechanism to provide an empirical basis for managing their negative emotions and maintaining mental balance. In the past, scholars conducted a great deal of research on the overall mental health of college students, with less research being on the impact of the COVID-19 pandemic on negative emotions (Wang,C et al., 2022).[22] In view of this, this paper provides some theoretical guidance for the prevention, intervention, and mitigation of loneliness among college students and provides theoretical guidance for colleges and relevant education departments on mental health education by studying the impact of the risk perception of COVID-19 on college students' loneliness, along with the mediating role of psychological resilience and the regulatory role of social support.

2. Research Assumptions

Loneliness refers to an unpleasant feeling caused by the lack of some important quantitative or qualitative factors in personal social relations (Zhang, 2023).[31] In recent years, the development of the Internet and the pressure of life have led to the weakening of relationships between people.

People feel lonely, which has become a common phenomenon in society, especially among college students. College is a key period of life growth. Ensuring a healthy mental state helps to improve the enthusiasm of college students towards learning and life. Previous studies have shown that loneliness is closely related to autism, inferiority complex, depression, self-injury, and other issues. Loneliness can seriously affect an individual's mental health, leading to depression, and can affect learning and work efficiency. At the same time, loneliness can also have a negative impact on physical health. Long-term loneliness can lead to adverse reactions such as anxiety, insomnia, and palpitations, which affect people's health. The COVID-19 pandemic not only threatened people's lives, but also brought serious psychological problems. Loneliness is a problem worthy of attention. The psychological problems experienced by college students caused by the COVID-19 pandemic have been of significant concern to the state. The leading group of the Ministry of Education tasked with how to cope with the new coronavirus indicated that psychological researchers had to make judgments on the mental health of students so that schools at all levels could prepare a targeted response. Therefore, it was very important to explore the influencing factors and mechanisms of college students' loneliness in order to help prevent, intervene in, and alleviate loneliness.

Risk perception is an individual's subjective understanding of the risk of an emergency. The risk perception of the COVID-19 pandemic refers to the subjective judgment of the possibility of being affected by the pandemic (Ye et al., 2021).[28] Studies have shown that risk perception is an important factor influencing negative emotions. The COVID-19 pandemic elevated the risk perception of citizens. The perception that the COVID-19 pandemic could lead to unemployment and physical injury had a certain negative impact on people's emotions, especially regarding the measures taken to prevent and control the pandemic, such as sealing, isolation, and online teaching, which made college students unable to live and socialize normally, causing them to feel lonely. According to the hierarchy of needs theory, when individual social needs are not met, this causes emotional and social loneliness (Liu et al., 2023).[15] In addition, from the perspective of quality stress theory, the pressure brought by the COVID-19 pandemic may have activated a certain quality or susceptibility. The effect of this quality or susceptibility is psychopathological symptoms. The COVID-19 pandemic led to an increase in stress among college students, resulting in mental symptoms such as loneliness and depression. Therefore, the risk perception of the COVID-19 pandemic may be closely related to enhanced loneliness, so this study proposes hypothesis 1: The risk perception of the COVID-19 pandemic is significantly positively correlated with loneliness.

Resilience is a way of coping with stress. It is an individual's ability to recover from negativity and cope with sudden changes in the environment. Resilience is a protective factor that can effectively reduce the psychological and physical damage caused by loneliness. Most research on psychological resilience has been related to adversity. Natural disasters, wars, diseases, and other circumstances affect psychological resilience. As a major public health event, the COVID-19 pandemic also affected people's psychological resilience (Xu et al., 2021).[26] When dealing with loneliness caused by various factors, psychological resilience can play a positive role in maintaining stable mental health, allowing individuals to seek harmony. College students are in a critical period of academic, professional, and personal development, facing a variety of choices and decisions, so factors such as employment anxiety, risk awareness, and passive home anxiety caused by the pandemic were likely to affect their psychological resilience, and psychological resilience is significantly related to loneliness. Psychological resilience refers to the ability to adapt to adverse environments. The lower an individual's psychological resilience, the more their mental health was affected by the pandemic, and the lonelier they felt (Gu, 2015).[4] It can be seen that the risk perception of the COVID-19 pandemic reduced people's psychological resilience, and this reduced

psychological resilience led to enhanced loneliness. Based on the above, this study proposes hypothesis 2: Psychological resilience played a mediating role between the risk perception of the COVID-19 pandemic and loneliness.

Social support is material and spiritual help and care given by others when individuals encounter difficulties or emergencies. Relevant studies have shown that social support is an important factor affecting mental health, and the more social support an individual receives, the more conducive it is to promoting mental health (Hu et al., 2023).[7] During the COVID-19 pandemic, social support was an important indicator of college students' mental health. During the pandemic, the social relationships among individuals in a social support system, especially positive or negative relationships with parents and friends, interacted with the negative effects caused by other difficulties, which had beneficial or harmful effects on college students' ability to adapt. For example, college students without close friends were more sensitive, depressed, and lonely than classmates with close friends during the pandemic. In all intimate relationships, reduced support and concern from parents is the main factor causing overall psychological problems among college students. Relevant studies have shown that social support, an important factor in predicting loneliness, is negatively correlated with loneliness. The less social support an individual has, the higher the degree of depression and anxiety, resulting in a more profound experience of loneliness (Luo et al., 2016).[16] Therefore, social support could effectively adjust the relationship between the risk perception of the COVID-19 pandemic and loneliness; that is, social support could reduce loneliness by reducing people's panic and anxiety about the pandemic. Therefore, more social support could also reduce the impact of the risk perception of the pandemic on loneliness. Accordingly, this study proposes hypothesis 3: Social support may have regulated the impact of the risk perception of the COVID-19 pandemic on loneliness.

To sum up, there is a correlation between risk perception, resilience, and loneliness, but there is a lack of research on the relationship between the three and the role of social support. At the same time, there are few studies on the relationship between the risk perception of the COVID-19 pandemic and college students' loneliness in China and a lack of research on the impact mechanism of the risk perception of the COVID-19 pandemic on loneliness.

3. Method

3.1. Research Data Collection Instrument

This study used a survey to measure the social and emotional impact of the COVID-19 pandemic on college students.

3.2. Research Population Description

This study tested students at several undergraduate colleges in Hebei Province through a network questionnaire platform. A total of 650 questionnaires were distributed, and 582 valid questionnaires were collected, accounting for 89.54% of the total. Among them, 295 respondents (50.69%) were female and 287 (49.31%) were male, 139 (23.88%) were freshmen, 161 (27.66%) were sophomores, 148 (25.43%) were juniors, and 134 (23.03%) were seniors. The subjects' ages ranged from 18 to 24 years old, with an average age of 21.06 years old.

3.3. Research Tools

3.3.1. COVID-19 Pandemic Risk Perception Scale

The COVID-19 pandemic risk perception scale mainly refers to the research of Lin & Lagoe (2013)[10] and Yan & Wen (2020).[27] This scale has two dimensions and eight topics to investigate risk perception at the individual and social levels; examples include "The COVID-19 pandemic is closely related to me/the whole country", "I/ordinary people have the chance to be infected", "I/ordinary people will be very worried about being infected", and "I/the public think the pandemic is very serious." A 5-point Likert scale is used, in which 1 =

strongly disagree and 5 = strongly agree. The higher the score, the higher the awareness of the risk of COVID-19.

3.3.2 Loneliness Scale for College Students

This paper uses the third edition of the loneliness scale (UCLA) to measure college students' loneliness (Linda et al., 2023).[11] This edition of the scale has 20 items, including 11 forward scoring questions and 9 reverse scoring questions; examples include "Do you often feel harmonious with people around you?", "Do you often feel that no one knows you very well?", and "Do you often feel shy?" . A 4-point Likert scale is used for these items, where 1 = very little and 4 = frequently. The score represents the level of individual loneliness.

3.3.3 Chinese Version of Resilience Scale

The Chinese version of the resilience scale was revised and compiled by Xing et al. (2016)[25] according to the Connor–Davidson Resilience Scale , and has a total of 25 items in 3 dimensions: resilience (13 items), self-improvement/strength (8 items), and optimism (4 items); examples include "I can adapt to change", "I like challenges", and "I know where to ask for help". A 5-point Likert scale is used, where 1 = never and 5 = always. The higher the score, the higher the psychological resilience.

3.3.4 Social Support Scale

The social support rating scale compiled by Liu & Xiao (2002)[14] was used in this study. The scale consists of 10 items in 3 dimensions: objective support (3 items), subjective support (4 items), and utilization of social support (3 items); examples include "How many close friends do you have that can be supported and helped?", "In the past, when you were in an emergency, what did you use to get comfort and care?", and "When you were in trouble, how did you ask for help". The higher the score, the higher the level of social support.

3.4 Statistical Processing

In this study, SPSS software was used to carry out common method deviation test and correlation analysis on the collected data, and Stata software was used to carry out descriptive statistics and regression analysis on the data, and the mediation effect test and regulation effect test were carried out.

4. Results

4.1 Common Method Deviation Inspection

This study used the Harman single factor test method to test the common method variance of all items in the questionnaire (Bolin & Hayes, 2014).[1] As a result, three common factors with eigenvalues greater than 1 were extracted from the seven items, and the first common factor explained 20.03% of the total variation, which is less than the standard critical value of 40.00%. Therefore, there was no serious common method variance in the data of this study.

4.2 Descriptive Statistics and Correlation Analysis Among Variables

The results of variable descriptive statistics and correlation analysis are shown in Table 1. The average age and grade are 21.06 years and 2.48, respectively, indicating a relatively uniform distribution of age and grade among college students in the sample. The average score of pandemic risk perception is 23.88, and the standard deviation is 3.95. The results show that the level of risk perception among college students in the sample is relatively low, and the distribution of scores is relatively concentrated. The mean scores for loneliness, resilience, and social support are 49.98, 75.49, and 39.24, with standard deviations of 5.32, 6.77, and 6.48, respectively. These standard deviations are high, indicating that the data are relatively scattered. In addition, in terms of correlation, the relationship between the main research variables (gender, age, and grade as control variables) generally conforms to the assumptions of this study. Among them, the correlation coefficient between the risk perception of the COVID-19 pandemic and loneliness is 0.11, indicating a significant positive correlation. The correlation coefficient between risk perception and resilience is -0.21, indicating a

significant negative correlation, and the correlation coefficient between resilience and loneliness is -0.13, indicating a significant negative correlation.

4.3 Mediation Effect Test

The mediating effect of psychological resilience between the risk perception of the COVID-19 pandemic and loneliness controlled by gender, age, and grade was tested, and the results are shown in Table 2. The results of the t-test show that the risk perception of the COVID-19 pandemic significantly positively predicted loneliness, with t = 2.65 (β = 15, t > 2.576), and negatively predicted psychological resilience, with t = -5.07 (β = -34, t < -2.576). When both the risk perception of the COVID-19 pandemic and psychological resilience predict loneliness, t = -2.68 and the negative predictive effect of psychological resilience on loneliness is significant (β = -0.07, t < -2.576). The positive predictive effect of risk perception on loneliness is still significant, t=2.05 (β= 12, t>1.96). The mediating effect test shows that psychological resilience plays a mediating role in the prediction of loneliness by the risk perception of the COVID-19 pandemic.

Table 1. Descriptive Statistics and Correlation Analysis of Variables

	M	SD	1	2	3	4	5	6
1 Gender	-	-	-					
2 Age	21.06	2.02	0.00					
3 Grade	2.48	1.09	-0.03	-0.00				
4 Risk perception of COVID-19 pandemic	23.88	3.95	0.04	-0.06	-0.06			
5 Loneliness	49.98	5.32	-0.02	0.02	-.083*	0.11**		
6 Psychological resilience	75.49	6.77	-0.12**	0.00	0.03	-0.21**	-0.13*	
7 Social support	39.24	6.48	-0.03	0.05	0.01	-0.12**	-0.07	0.04

Note: Gender is a dummy variable (1 = male, 0 = female). ** Correlation significant at 0.01 level (two tailed); * correlation significant at 0.05 level (two tailed).

Table 2. Regression Analysis of Mediating Effect of Resilience

Regression equation		Overall fitting index			Significance of regression coefficient			
Result variable	*Predictive variable*	*R*	*R2*	*F*	*β*	*CI lower limit*	*CI upper limit*	*T*
Loneliness	*Gender*	0.13	0.02	2.90	-0.27	-1.13	0.60	-0.61
	Age				0.08	-0.14	0.29	0.70
	Grade				-0.38	-0.77	0.02	-1.87**
	Risk perception of COVID-19 pandemic				0.15	0.04	0.26	2.65***
Psychological resilience	*Gender*	0.24	0.06	8.72	-1.52	-2.59	-0.44	-2.77***
	Age				-0.03	-0.30	0.24	-0.22
	Grade				0.08	-0.41	0.58	0.32
	Risk perception of COVID-19 pandemic				-0.35	-0.49	-0.22	-5.07***
Loneliness	*Gender*	0.18	0.03	3.78	-0.40	-1.26	0.46	-0.91
	Age				0.07	-0.14	0.29	0.68
	Grade				-0.37	-0.76	0.02	-1.84**
	Psychological resilience				-0.09	-0.15	-0.02	-2.68***
	Risk perception of COVID-19 pandemic				0.12	0.01	0.23	2.05**

Note: * 1.645 ≤ t<1.96; **1.96 ≤ t < 2.576; *** 2.576 ≤ t.

4.4 Regulation Effect Test

The moderating effect of social support controlled by gender, age, and grade was tested, and the results are shown in Table 3. Together, the risk perception of the COVID-19 pandemic and social support significantly negatively predicted loneliness, with t = -2.00 (β = - 02, t < -1.96), indicating that the predictive effect of risk perception on loneliness is regulated by social support. The test results show that social support plays a moderating role in the prediction of loneliness by the risk perception of the COVID-19 pandemic.

5. Discussion

5.1 Relationship Between the Risk Perception of the COVID-19 Pandemic and Loneliness of College Students

The results of this study show that there is a significant positive correlation between the risk perception of the COVID-19 pandemic and college students' loneliness; that is, the higher the level of risk perception, the stronger loneliness will be. Research shows that college students, who are in their late adolescence and early adulthood, are vulnerable to the external environment (Brandy et al., 2015).[2] Having interpersonal relationships is an important factor that affects loneliness. The main purpose of individual growth in adulthood is to establish relationships through social activities to avoid loneliness. According to the theory of personality time development, college students are in their infancy. If they do not have satisfactory social activities, they will lack a sense of security, resulting in loneliness. The outbreak of the COVID-19 pandemic led to college students' inability to socialize normally face-to-face, as they experienced a period of physical isolation from teachers, classmates, family members, and so on. If college students' social needs are not met in the critical period of growth, they will feel lonely (Ma et al., 2021).[17]

In the field of psychology, risk represents uncertainty, which means that individuals may feel hurt and threatened. College students worried that they or their relatives would be infected by the virus and experience its sequelae. They worried that elders with underlying diseases would have difficulty surviving. They worried that the pandemic would affect their employment and postgraduate entrance examinations and other opportunities related to their future. They worried that their families would not be able to work normally, and their income would be reduced. As a result, college students had a higher level of risk perception of the COVID-19 pandemic and thus had anxiety and experienced loneliness. At the same time, college students were often exposed to negative information about the pandemic released by the media and anxious information on the Internet, which was more likely to lead to loneliness. In addition, college students have high expectations for their own lives (Wang & Zhang, 2022).[24] Today's college students are experiencing a time of fast development, with rich leisure activities, entertainment projects, and relaxation

Table 3. Regression Analysis of Regulating Effect of Social Support

Regression equation		Overall fitting index			Significance of regression coefficient			
Result variable	*Predictive variable*	*R*	*R2*	*F*	*β*	*CI lower limit*	*CI upper limit*	*T*
Loneliness	*Gender*	0.17	0.03	3.29	-0.26	-1.12	0.60	-0.59
	Age				0.08	-0.13	0.29	0.72
	Grade				-0.37	-0.76	0.03	-1.83*
	Risk perception of COVID-19 pandemic ×				0.78	0.14	1.43	2.38**
	social support				0.32	-0.07	0.71	1.63
	Risk perception of COVID-19 pandemic × social support				-0.02	-0.03	-0.00	-2.00**

Note: * 1.645 ≤ t < 1.96; **1.96 ≤ t < 2.576; ***2.576 ≤ t.

activities. Therefore, the pandemic not only had an uncertain impact on their work and life, but also did not allow them to relieve pressure through leisure and entertainment activities, resulting in excessive accumulation of pressure and loneliness. To sum up, college students' subjective risk perception of the COVID-19 pandemic led to a strong sense of loneliness, and the risk perception positively predicted the loneliness.

Loneliness will affect college students' mental and physical health. The long-term negative emotions caused by loneliness can lead to depression, autism, and even self-injury and suicide. Therefore, it is very important to reduce the impact of major public health emergencies. First of all, the education department and management department should implement targeted psychological intervention measures for different types of students to help them build a stress defense system and guide them to find useful resources when they are aware of the high risk and emotional changes, such as seeking help from relatives, friends, teachers, and organizations, so as to reduce their loneliness and prevent extreme behaviors. Secondly, when a public emergency occurs, colleges and students' parents should guide students to correctly understand the event and obtain relevant information from authoritative channels (Sun et al., 2022).[19] Colleges should provide students with official websites to obtain relevant information. Relevant social departments should strengthen their supervision of the network environment, severely punish publishers of false statements, prevent students from spreading false rumors, inflammatory statements, and other negative information, and provide true information (Mao & Jiang, 2023).[18] Finally, as independent individuals, college students should learn to adjust themselves, find their own adjustment methods in the face of pressure, find their own relaxation methods, improve their ability to deal with emergencies calmly and actively, and improve their ability to adapt to various changes in life (Zhang, et al., 2022).[32]

5.2 Mediating Role of Psychological Resilience

The analysis showed that psychological resilience played a mediating role in the risk perception of the coronavirus pandemic and the loneliness of college students. First, the risk perception of the pandemic negatively predicted psychological resilience. At the beginning of the outbreak of COVID-19, people all over the country were in a tense mood. College students' fear of contracting the virus rose sharply. Later, the prevention and isolation measures taken by the state to prevent the spread of the disease affected the normal lives of college students. In addition, the post-pandemic era may also involve employment pressure for college students, making their lives more difficult than expected. These perceptions of the high risk of the COVID-19 pandemic led to reduced psychological resilience (Gu et al., 2021).[5]

This study also found that psychological resilience negatively predicted college students' loneliness. On the one hand, the positive attitude inherent in psychological resilience, to a certain extent, allows individuals to deal with setbacks and improve their psychological energy, making them more capable of coping with emergencies, which promotes the development of mental health. After experiencing the negative impact of the pandemic, students with strong psychological resilience could more actively adjust their emotions and find ways to solve problems. They could use their positive attitude and the social support in their environment to deal with adversity and frustration to reduce the negative impact of the pandemic and reduce loneliness (Ye et al., 2017).[29] On the other hand, as an excellent quality, psychological resilience can directly reduce loneliness (Gu, 2015).[4] Therefore, psychological resilience is an important factor that enables college students to better adapt to a new environment (Liu & Wang, 2017).[13] Enhancing psychological resilience is very important to reduce loneliness. When facing loneliness, college students can effectively use "self-efficacy" to avoid the adverse effects and can enhance their psychological resilience so as to better maintain their mental health. This intermediary

model suggests that college students should reduce their loneliness by enhancing their psychological resilience and improving their ability to deal with setbacks.

The level of college students' psychological resilience is closely related to their mental health, environment, quality of will, and social support (Ding & Su, 2023).[3] First of all, college students can improve their psychological resilience through sports such as long-distance jogging. The physical and the psychological are interrelated. Sports can effectively exercise the body and make college students happy. Secondly, college students should strive to change their negative environment, stay away from those who often express negative emotions, and put themselves in a positive environment. In addition, schools should cultivate students' willpower, have the goal of cultivating their noble qualities in the whole educational process, and strive to play a positive role in classroom and extracurricular activities, school competitions, and so on. Schools should create a positive campus environment and improve students' willpower (Zhou, 2021).[34] College students should also try to look at problems from a positive perspective, be optimistic about difficulties and setbacks, and cultivate a positive attitude. Having a positive attitude is conducive to having an optimistic attitude toward environmental changes and sudden crises, which can improve their psychological toughness. Finally, psychological resilience can also be improved through social support. College students have little social experience, and they will inevitably be unable to cope with emergencies alone. If they get help from their families, friends, and society in terms of material or spiritual needs, they will find a certain direction to follow, and can gradually improve their psychological resilience.

5.3 Regulating Role of Social Support

This study also found that social support can play a moderating role in the relationship between risk perception and loneliness. There is a negative correlation between social support and loneliness; that is, compared with college students who receive more social support, among those who receive less social support, the risk perception of the COVID-19 pandemic had a more significant positive predictive effect on loneliness. When families, friends, schools, and society saw the negative impact of the pandemic on college students, they could fully understand their needs and provide help, alleviating their negative emotions. Especially in the worst period of the pandemic, students suddenly experienced isolation, school closures, and other prevention and control measures. At this time, social support buffered the negative impact of the fear of infection on their mental health, and they could obtain material support such as masks and disinfection supplies. Specific suggestions and guidance, psychological and physical care, and other social support can reduce loneliness. Social support can also help college students be optimistic and positive when dealing with emergencies, strive to adapt to sudden changes in their learning and living environment, and reduce the negative impact of emergencies, so as to reduce loneliness.

Social support refers to material and spiritual support from family, friends, and society. When surrounded by others, college students' loneliness will naturally decrease. This study further shows that social support can buffer the negative impact of emergencies on physical and mental health and can help maintain and improve physical and mental health, and the social support received by college students buffered the impact of the risk perception of the COVID-19 pandemic on their loneliness. Strengthening social support may be an effective way to help college students reduce their loneliness after experiencing a major public health emergency and can reduce the impact of emergencies on their mental health (He et al., 2014).[6] Therefore, universities, families, and society at large should pay attention to the mental health of college students, especially in the face of major public health emergencies or other sudden changes in the environment, strengthen the correct guidance for them, provide material and emotional help, and make them feel supported and not alone.

Strengthening social support means building a strong social support system. First, in the family aspect, it is necessary to create a healthy and happy family atmosphere for college students, maintain good communication, pay attention to giving them enough respect and care, and provide a sufficient sense of security and happiness, which is the basis for building a social support system. When individuals have a sense of security and happiness, their sense of loneliness will be reduced (Wang, D et al., 2022).[23] Secondly, in the school aspect, schools should create an upward and positive learning environment for students, strengthen communication between teachers and students, and set up peer counseling rooms to provide free psychological counseling services in order to prevent and intervene in loneliness. Schools should also provide more extracurricular activities to reduce students' loneliness by enriching their lives. Finally, in the social aspect, society should create a good and positive social atmosphere for students. Society can provide jobs for college students, guide them to correctly understand a pandemic, and provide subsidies for students with difficulties to reduce their risk perception, so as to mediate the effect of pandemic risk on loneliness.

6. Conclusion

This study explored the impact of risk perception on loneliness and the mechanisms of psychological resilience and social support. As a result of the research, we can draw the following conclusions: (1) The risk perception of the COVID-19 pandemic had a significant positive predictive effect on college students' loneliness; it had a significant negative predictive effect on psychological resilience, and psychological resilience had a significant negative predictive effect on loneliness. (2) Psychological resilience played a mediating role between the risk perception of the COVID-19 pandemic and loneliness. (3) Social support played a moderating role between the risk perception of the COVID-19 pandemic and loneliness. This study confirms that the risk perception of the COVID-19 pandemic not only directly affected college students' loneliness, but also indirectly affected loneliness through psychological resilience, and that social support can regulate the relationship between risk perception and loneliness; that is, social support reduces the negative impact of the risk perception of COVID-19 on college students' loneliness.

This study systematically investigated the mechanism of COVID-19 pandemic risk perception affecting college students' loneliness through psychological resilience, deepening the research on the impact of pandemic risk perception on loneliness and providing an empirical basis for the assertion that risk perception induces negative emotions. From the perspective of psychological resilience, this study revealed the mediating role of the impact of the risk perception of the COVID-19 pandemic on loneliness and verified the moderating role of social support in it. This provides a different way to address the mental health problems of college students clinically, that is, to pay attention to their psychological resilience, implement early intervention, and reduce their loneliness. The results of this study suggest that educators should pay attention to college students' mental health and provide social support as much as possible to reduce their loneliness and other negative emotions. In the process of reducing the loneliness of college students caused by public health emergencies, we can simultaneously improve the levels of social support (including material and spiritual support) and psychological resilience. Colleges should pay attention to students with weak psychological resilience relative to their peers and regularly provide in-class and extracurricular practical activities, and in the process gain as much recognition as possible, guide college students to improve their self-awareness and ability to adapt to environmental changes and cultivate a tough character in the face of difficulties to improve their overall psychological resilience in case of the occurrence of major emergencies.

This study still has some limitations. First, a self-assessment scale was used to measure risk perception, loneliness, psychological resilience, and social support

related to the COVID-19 pandemic. This self-reporting method is easily affected by subjective factors, and we cannot ensure that the results completely objectively and accurately reflect the real situation of the subjects. In future research, we can combine it with another rating scale as well as a projection test and use an implicit experiment to carry out a more comprehensive and accurate assessment of variables such as risk perception, loneliness, psychological resilience, and social support. Second, it is difficult to determine a causal relationship between variables by cross-sectional study. Future studies should use longitudinal research or an experimental design to verify the relationship between risk perception, loneliness, psychological resilience, and social support. Third, the conclusion of this study shows that there is a significant correlation between the risk perception of the COVID-19 pandemic and loneliness and that psychological resilience plays a mediating role, but how does psychological resilience affect loneliness? Does the risk perception of the COVID-19 pandemic affect loneliness through other mediators? These are questions worthy of further study.

Author Contributions

Conceptualization, Jinhui Ning; methodology, Le Han and Jinhui Ning; software, Le Han; validation, Shi Yin and Jinhui Ning; formal analysis, Shi Yin; investigation, Jinhui Ning; resources, Le Han; data curation, Le Han; writing—original draft preparation, Le Han and Jinhui Ning; writing—review and editing, Jinhui Ning; supervision, Shi Yin and Jinhui Ning; project administration, Jinhui Ning; funding acquisition, Jinhui Ning. All authors have read and agreed to the published version of the manuscript.

Funding

Data Availability Statement

The data presented in this study are available on request from the corresponding author.

Conflicts of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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